



# REPORT ACTIV ITY RESULTS

Prey Animal Inventory and Habitat Assessment of  
Komodo Dragons (*Varanus komodoensis*)  
In Wolo Tadho CA in  
2024

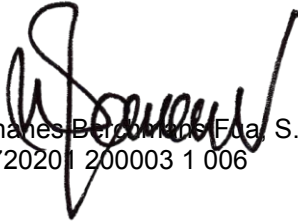
East Nusa Tenggara KSDA Center, Region II  
KSDA Division




## ENDORSEMENT SHEET

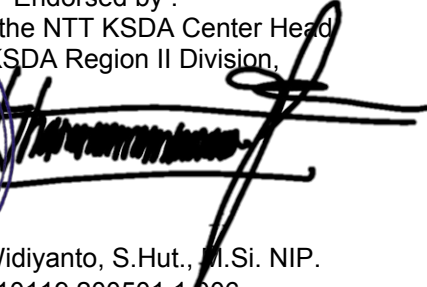
On behalf of the Head of the East Nusa Tenggara (NTT) Natural Resources Conservation Center, hereby approves and endorses the Activity Implementation Report (LPK) Inventory of prey animals and komodo dragon habitat studies in Wolo Tadho Nature Reserve Year 2024 with the methods, costs and implementation schedule as described in this implementation report.

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## FOREWORD

The Komodo monitor lizard (*Varanus komodoensis*) is an endemic Indonesian reptile species found only on several islands in East Nusa Tenggara. As an apex predator in its ecosystem, the existence and sustainability of the Komodo monitor lizard population is highly dependent on the availability of prey animals and the quality of its habitat.

Effective conservation of Komodo monitor lizards requires an in-depth understanding of prey animal population dynamics and habitat characteristics that support the survival of this species. Therefore, it is very important to conduct prey animal inventories and habitat assessments for Komodo monitor lizards.

With praise and gratitude to God Almighty, this Activity Implementation Report (LPK) of Prey Animal Inventory and Komodo Lizard Habitat Study in Wolo Tadho Nature Reserve Year 2024 can be prepared as a form of our responsibility in carrying out the task of monitoring rare and protected animals. This activity aims to support the conservation of Komodo dragons as an invaluable natural heritage and provide the latest data and information on habitat conditions, populations, and conservation efforts. We realize that the preparation of this report cannot be separated from the support of various parties, both related agencies and local communities. Therefore, we would like to express our gratitude and highest appreciation to all those who have assisted in the implementation and preparation of this report. We hope that this report can provide benefits for the conservation of Komodo dragons and the sustainable management of conservation areas.

Compiler



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## I. INTRODUCTION

### A. Background.

Komodo monitor lizards are the largest lizards in the world, with adult males reaching 3 m in length and weighing 87 kg (Jessop et al., 2006). Although it is unusual for terrestrial reptiles to be apex predators, the absence of carnivorous mammals and their large size make adult Komodo monitor lizards apex predators in their ecosystem (Auffenberg, 1981; Ciofi, 2002; Jessop et al., 2006; 2007). Currently, the distribution of Komodo monitor lizards is restricted to five small islands in Eastern Indonesia, with four island populations located within Komodo National Park (TNK) and another fragmented population on the island of Flores (Ciofi & De Boer, 2004). Thus, long-term monitoring is recommended to understand the status of Komodo monitor lizard populations so that management authorities can identify threatened populations and take action to save them (Jessop et al., 2007).

According to Auffenberg (1981), the distribution of Komodo dragons includes western Flores Island, Komodo Island, Rinca Island, Padar Island, Gilimotang and Nusa Kode Island. The distribution on Flores Island can be grouped into two main parts, namely in the western part of Flores Island from Labuan Bajo to Nangalili and on the North Coast from Dampek to the west of Riung (BBKSDA NTT-KSP, 2019, Ciofi, 2002). In the NTT KSDA Center area, several conservation areas are the habitat of these animals, namely: Wae Wuul CA and TWA Tujuh Belas Pulau, including the Pota HL Essential Ecosystem Area, Longos Island, Torong Padang, Golo Mori, Kerita Mese and Nanga Bere. .

Based on the Minister of Environment and Forestry Regulation Number: P.106/MENLHK/SETJEN/KUM.1/2018, Komodo dragons are included in the list of protected animals. Internationally, Komodo dragons are categorized as Vulnerable by IUCN and included in Appendix I of CITES. The existence of this animal is generally only known in the Komodo National Park area, but the actual condition is that this rare animal can also be found in the Flores Island area and its surroundings. Komodo dragon is one of the animals included in the list of 25 priority endangered species, determined by the Decree of the Director General of KSDAE Number: SK.180/IV-KKH/2015 dated June 30, 2015 so that its population must be increased. Collecting data and information on Komodo dragons is important to determine the next steps and conservation strategies. Wolo Tadho CA is an area within the conservation area (in situ), one of the main constraints in management efforts outside the conservation area (in situ). Monitoring the Komodo monitor lizard population is necessary to determine the presence and estimation of the current Komodo monitor lizard population in nature, especially in Wolo Tadho CA. Data and information obtained through this activity will be

used in management as a consideration in making policies related to Komodo monitor lizards.

## **B. Aims and Objectives**

The purpose of the prey animal inventory and habitat study of Komodo dragons in Wolo Tadho Nature Reserve in 2024 is to monitor the population of Komodo lizards and prey animals of Komodo lizards in Wolo Tadho Nature Reserve. While the objectives of this activity are:

1. To estimate the value of site occupancy, density, probability of detection of presence and abundance of Komodo monitor lizards at the Wolo Tadho CA study site;
2. To determine the density index per hectare of ungulate prey;
3. To determine the Index of Importance (INP), which is a parameter to measure plant dominance at the study site;
4. To identify potential threats to the Komodo monitor lizard distribution area;

## **C. Legal Basis**

1. Presidential Decree No. 4 of 1993, concerning National Animals and Flowers;
2. Law No. 5 of 1990 on the Conservation of Biological Resources and Ecosystems;
3. Law No. 41 of 1999 on Forestry;
4. Government Regulation No. 28 of 2011 on Nature Reserve Areas and Nature Conservation Areas;
5. Minister of Environment and Forestry Regulation No. 15 of 2021 on the Organization and Work Procedures of the Ministry of Environment and Forestry;
6. Minister of Environment and Forestry Regulation No. 17 of 2022 on the Organization and Work Procedure of the Technical Implementation Unit of the Directorate General of Natural Resources and Ecosystem Conservation;
7. Budget Implementation List (DIPA) of Direct Foreign Grants for In- Flores Project Year 2024;
8. Task Letter of the Head of the East Nusa Tenggara KSDA Center Number: ST.772/K.5/BKWII/PEG.3/11/2024 concerning carrying out Komodo monitor lizard (*Varanus komodoensis*) population monitoring activities outside conservation areas in Torong Padang and Wolo Tadho CA in 2024.

## II. METHODOLOGY

### A. Methods for Detecting the Presence of Komodo Lizards, Prey Animals and Other Animals Using Camera Traps

Camera traps have been the primary survey method for monitoring large mammal predators (Karanth & Nichols 1998; Trolle & Kery 2003; Karanth et al. 2004; Rosellini et al. 2008; Thorn et al. 2009). Camera traps are commonly used to monitor populations of species that are very difficult to observe directly, especially because they are highly sensitive to human presence (Hariyadi et al. 2008; Karanth & Cellam, 2009). The utilization of camera traps to estimate the population size of wild animals has been applied to tigers (Karanth et al. 1994; Karanth and Nichols 1998; O'Brien et al. 2002), Javan Rhinos (Griffith 1993; Hariyadi et al. 2011). In principle, camera traps are used to detect the presence of the target animal under study. Although camera traps are generally used for mammal population monitoring, research shows that camera traps can also be used to detect the presence of large reptiles such as Komodo dragons (Ariefiandy et al. 2013).

The method used in monitoring the Komodo monitor lizard (*Varanus komodoensis*) population is by using camera traps. Camera traps are considered more efficient in terms of cost and time (Ariefiandy et al. 2013).

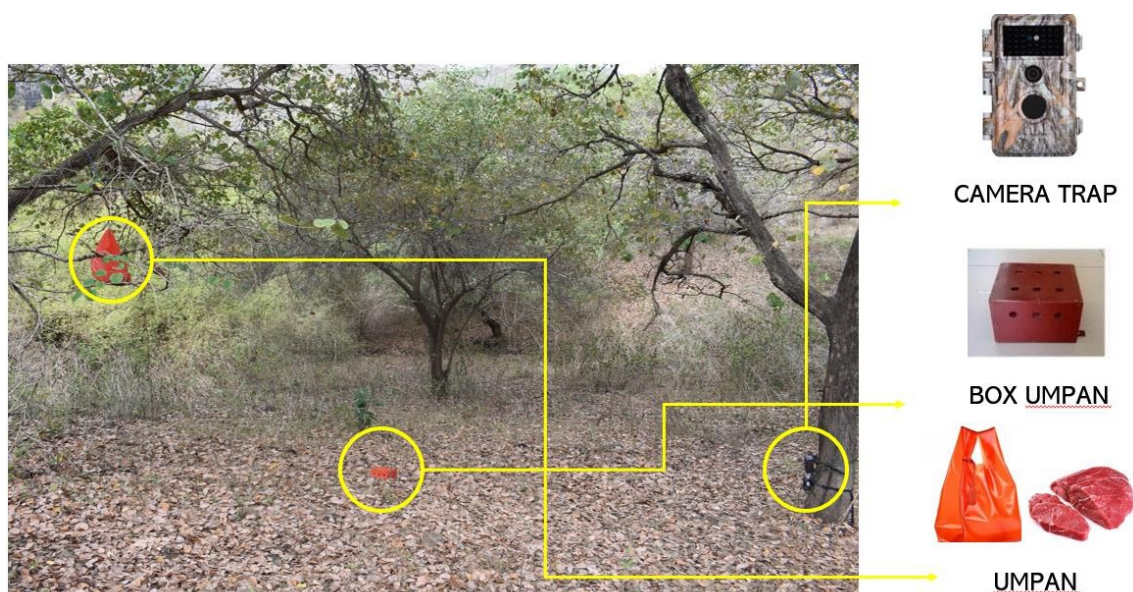
Monitoring of the Komodo monitor lizard (*Varanus komodoensis*) population was conducted from June 25, 2024 to June 30, 2024 in Wolo Tadho CA. At the monitoring location, 15 sampling point locations / camera trap installation points were determined with consideration of 1) references from the 2016 Flores Komodo dragon expedition activities, 2) the use of a 1km<sup>2</sup> grid (core home range area), 3) the area to be studied, 4) representation of habitat types preferred by Komodo monitor lizards, 5) information from the community (direct encounters), 6) resources, accessibility, and time.

At each sampling location, monitoring was conducted for 6 consecutive days (6 repetition sessions), resulting in 156 sessions of time interval periods for collecting data on the presence of Komodo dragons at each sampling location point. Thus, the overall sampling design provides 156 sessions of possible Komodo monitor lizard presence detection for each method used. Komodo monitor lizard presence data (both photos and videos) were recorded at each location for each time interval period.

Camera trap device (Blaze Video model A-252). The camera trap (A) was attached to a tree trunk at a height of 40 cm from the ground and placed at a distance of 3-4 meters from the bait box (B) and hanging bait (C) with the aim of spreading the smell of meat to attract dragons (Figure 1). Camera traps were programmed to take 3 pictures each time an animal was detected and 1 15-second video.

The time interval for taking pictures and videos was set at 15 minutes to avoid taking pictures and videos of the same animal continuously. The results of the data collection are written in the form of a Tally Sheet (attached) as an analysis material in data processing.

The purpose of using this method is to determine the distribution of komodo lizards in the presence or absence of komodo lizards at the sampling point, so that information on the distribution of komodo lizards in Wolo Tadho CA is obtained in the form of data on the presence and absence of komodo lizards and their distribution map. The use of camera traps is not only for komodo monitor lizards, but also to obtain information on the presence of prey species of komodo monitor lizards and other animals, both competing predators of komodo monitor lizards such as dogs (*Canis. Sp*) and water monitor lizards (*Varanus salvator*) and animals that are not competing predators of komodo monitor lizards such as burnt birds and other bird species.



Installation of camera traps

## **B. Analysis to Estimate Site Occupancy, Density and Abundance of Komodo monitor lizards**

Analysis of the value of the proportion of the area occupied by Komodo monitor lizards used the site occupancy model approach, with the help of the PRESENCE 2.4 program (Hines, 2006; <http://www.mbr-pwrc.usgs.gov/software/presence.html>). The analysis model used was the Royle/Nichols Heterogeneity model (Royle and Nichols, 2003) The analysis was based on a modification of the closed population Mark-Recapture method by MacKenzie et al. (2002; 2006). The model estimates population size based on temporally replicated presence/absence data at several study sites. The model assumes that heterogeneity in detection probability among study sites is due to heterogeneity in abundance, meaning that the higher the probability of detection, the higher the probability of detection.

of detection indicates a tendency for higher abundance values as well (Royle and Nichols, 2003).

The single season model was chosen because data collection is conducted over a short period of time on a regular basis without any long breaks in time that could disrupt data collection efforts, so weather conditions are relatively the same (MacKenzie et al., 2002). The basic assumptions that must be met in the single season model include:

(1) the study site is free from changes during the sampling duration, (2) the probability of occupancy is the same for all areas, (3) species can be identified well, (4) the probability of detection of a species in one area is independent of other areas (MacKenzie et al., 2002; MacKenzie & Kendall, 2002).

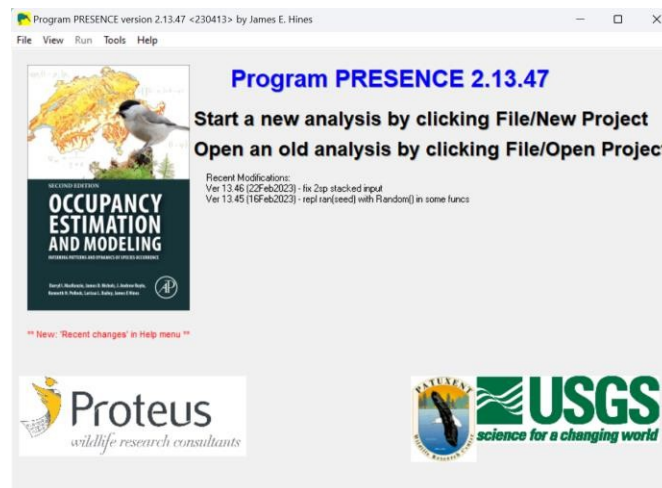


Figure 2. Presence application

### C. Monitoring of Ungulate Prey Animals

Various methods have been used to conduct direct surveys of animals (Buckland et al., 2001). However, for some species there are problems with capture techniques, so indirect surveys by finding signs of their presence (pellets, droppings, nests, tracks, etc.) can provide better data.

Dung counts using line transect, quadrat sampling, or line transect-based sampling methods have been used extensively to estimate the numbers, often to provide population density indices, of a wide range of vertebrate species including deer, kangaroos, elephants, possums, pigs and goats (Forsyth et al. 2003; Marques et al. 2001). The advantage of this method is that it is not influenced by avoidance behavior or the presence of dense vegetation that reduces the probability of encounter.

The transect method is not difficult to implement in the field, and multiple species can be recorded at the same time. This method can be applied to monitor the ungulate prey of Komodo lizards, namely Timor deer (*Cervus timorensis*), buffalo (*Bubalus bubalis*), wild boar (*Sus scrofa*).

In the Komodo dragon monitoring activities in Wolo Tadho CA, the number of transects was determined as many as 15 points spread over the study area, each camera trap has 2 transects. The length of each transect is 150 meters with a total of 30 plots, each plot is 5 meters apart with the size of each plot 3.14m<sup>2</sup> so that there are 900 observation plots. The results of the data collection are written in the form of a Tally Sheet (attached) as an analysis material in data processing.

The data output from this method is a prey density index value (not an absolute value) calculated by dividing the number of dung groups in all transects by the number of transects to obtain an average value of dung per transect which is then converted to dung group density per hectare.

$$IP = \frac{n_{1-30}}{nt}$$

Dimana *IP* : Indeks populasi  
*n*<sub>1-30</sub> : Jumlah keseluruhan kelompok kotoran dalam plot untuk keseluruhan transek di lokasi kajian  
*nt* : Jumlah transek

This index value can be used to compare Komodo monitor lizard prey densities between sites as well as to compare Komodo monitor lizard prey at the same site each year.

#### **D. Identification of Potential Threats to the Komodo monitor lizard Distribution Area**

The existence of most Komodo dragon populations on the island of Flores, which are located outside protected areas, is very vulnerable to the impact of human activities, so immediate mitigation efforts are needed to avoid extinction or wider reduction of Komodo dragon habitat on Flores Island in the future (Ariefiandy et al., 2021).

Wolo Tadho CA is one of the Komodo monitor lizard distribution areas with the status of a Nature Reserve Area (in situ) with potential threats being the presence of dogs and water monitor lizards. These two animals are competing predators for the Komodo monitor lizards.

The method used to identify the potential threat of land use change is to use a cellphone to take pictures of the condition of the Komodo monitor lizard distribution area, while the potential threat of competing predators uses the presence/absence data from the camera trap.

Ideally, a more comprehensive method would have been used, but considering the availability of resources and time, it was only done by taking pictures from mobile phones and data from camera traps.

### E. Vegetation Data Collection

The sampling method used is the plot line method. The sampling method of plant vegetation analysis is guided by Sundra (2018), namely the transect path is drawn perpendicularly from the baseline and also uses a non-destructive method, which is a method carried out without destroying the object being measured. Transect is a narrow path across the land to be studied. The aim is to determine the relationship between vegetation changes and environmental changes.

The process of collecting vegetation analysis data begins with determining the location assisted by GPS to determine the geoposition, then a transect line is made with a length of 60 meters. In the transect, it is divided into 3 quadrants with an area of 20x20 meters. In the 20x20 meter quadrant, tree stands, poles, saplings, and shrubs were measured using a sewing meter for the calculation of Diameter at breast height (DBH). Furthermore, within the quadrant, a plot of 10x10 meters was determined to determine pole stands, 5x5 meters for saplings and shrubs, and 2x2 meters for seedlings and understory plants. Analysis plots for each stand were taken in a representative manner. All data were recorded on observation sheets and plants found were documented to facilitate identification. The following is an example of the use of transects, quadrants and plots that have been carried out:

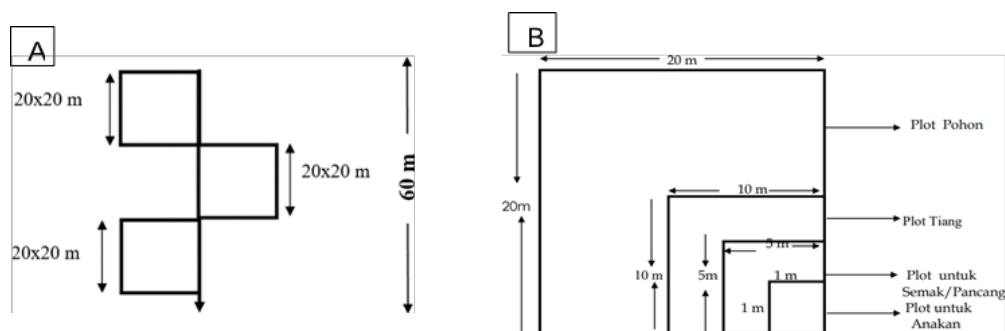
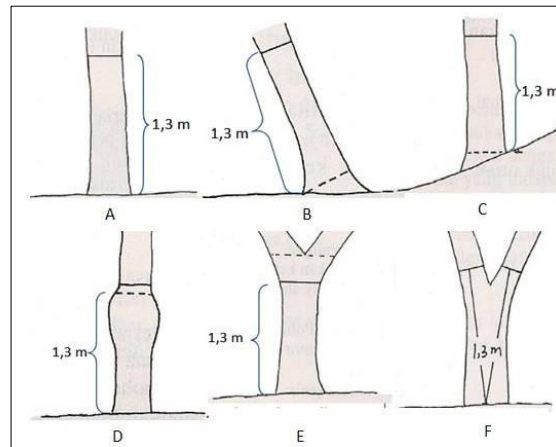


Figure 3. Schematic of the Combination Method of Paths and Plotted Lines. A. Transect; B. Plot and Sub-Plot

The measurement of Diameter at Breast Height (DBH) refers to Manuri (2011). The following is a scheme of DBH measurements that have been carried out:



Measurement of the circumference of a tree at breast height. A. Normal tree, B. Sloping tree, C. Normal tree on sloping ground, D. Deformed tree, E. Branch tree, F. Low branch tree (Manuri, 2011).

## F. Vegetation Data Analysis

### 1. Species Diversity Index (H')

The species diversity index is an index that expresses the interaction between diversity and evenness (Nurhidayah, 2017). The diversity index expresses community structure and ecosystem stability. Where if the better the species diversity index, the more stable an ecosystem (Diana, 2020). The diversity index can also function as an indicator of the complexity of an ecosystem if the important components in the calculation are met, namely abundance and evenness (Sundra, 2016).

In monitoring the biodiversity of the Golo Lijun location, East Manggarai Regency, NTT Province to calculate and interpret the data obtained, the Shannon-Winner diversity index is used. The Shannon-Winner equation (Ludwig, 1988) used in the analysis is as follows:

$$H' = -\sum P_i \times \ln P_i$$

Description:

H' : Shannon-Winner diversity index

P<sub>i</sub> : The ratio of the number of *i*-th species to the total number of species (n<sub>i</sub>/N)

n<sub>i</sub> : Number of *i*-th species

N : Total number of individuals of all species

In the calculation results, 5 categories were determined based on Fernando in Baliton (2020), namely:

H' value	Description
$H' \geq 3.50$	Very high
$3.00 \leq H' < 3.49$	High
$2.50 \leq H' < 2.99$	Medium
$2.00 \leq H' < 2.49$	Low
$H' < 1.99$	Very Low

Table 1. Shannon - Winner Diversity Index Criteria

## 2. Dominance Index (D)

The dominance index shows the level of influence of a species in a community. Determination of the dominance value serves to know or determine the types of flora that are dominant or not. The dominance index is calculated using the equation (Palaghianu, 2014), which is as follows:

$$D = \frac{(ni^2)}{N}$$

Description:

D : Species dominance index/relative

abundance  $ni$  : Number of i-th species

N : Total number of individuals of all species

In results of the calculation, determined determined 5 categories based on Palaghianu (2014), namely:

D value	Description
$D < 0.5$	Low dominance
$D > 0.5$	High dominance

Criteria for Species Dominance Index (Palaghianu, 2014)

## 3. Index of Evenness (E)

The Index of Evenness serves to determine the evenness of each species in each community encountered (Wahyuningsih, 2019). The calculation of the evenness index uses the following formula (Palaghianu, 2014):

$$E = \frac{H'}{\ln(S)}$$

Description:

E : Evenness Index

H' : Species Diversity Index Ln :

Natural Logarithm

S : Total number of species

In the calculation results, 5 categories are determined, namely:

E value	Description
0,96 - 1	Evenly distributed
0,76 - 0,95	Almost evenly distributed
0,51 - 0,75	Fairly Even
0,26 - 0,50	Less evenly distributed
0,00 - 0,25	Uneven

Table 3. Evenness Index Criteria

#### 4. Important Value Index (INP)

The important value index describes the role of a vegetation type in the ecosystem it lives in (Rakhmawati, 2018). Then each plant species found is calculated absolute density (Ka), relative density (Kr), absolute frequency (Fa) and relative frequency (FR) and at the tree level vegetation, the INP value is obtained from the results of absolute dominance (Da) and the sum of relative dominance (Dr), the analysis of the Important Value Index (INP) is calculated using the following mathematical equation (English in Permadi, et al., 2016):

##### a. Density

Density is the number of individuals of a plant species in a certain area. Density in observations is determined based on the discovery of plant species from a number of plots made (Febriandito, 2019). Density calculation is done by dividing the number of one tree per total plot area. Density calculation can be determined using the following formula:

$$K_a = \frac{n_i}{L}$$

Description:

Ka : Absolute density (ind./ha)

ni : Total number of stands of the i-th

species L : Total area of the plot

##### b. Relative Density

density relative density is density a plot which expressed in percentage:

$$K_{r i} = \frac{K_i}{K_{total}} \times 100\%$$

Description:

$K_r$  : Relative density

$K_i$  : Density of the *i*-th species

$K_{total}$  : Density of all species

### c. Absolute Frequency

Frequency is a description of population distribution in an area. Frequency can be measured by recording the presence or absence of a plant species in a sample area (area) which is ideally randomly distributed throughout the area studied (Febriandito, 2019; Nabila, 2021).

$$F_a = \frac{q_i}{Q}$$

Description:

$F_a$  : Frequency of the *i*-th species

$q_i$  : Number of points/plots where the *i*-th species was found  
 $Q$  : Total number of monitoring points/plots

### d. Relative Frequency

The frequency of a species divided by the frequency of all species expressed as a percentage (Febriandito, 2019):

$$F_r = \frac{F_a}{F_{total}} \times 100 \%$$

Description:

$F_r$  : Relative frequency

$F_a$  : Frequency of the *i*-th species

$F_{total}$  : Frequency of all species

### e. Dominance

Cover (Dominance) is described as the proportion of land cover by species that inhabit the area viewed from above. Dominance can indicate the success of a species in occupying a certain area and can be used as a reference for the suitability of the environment for a particular species. Dominance is calculated by dividing the weight, canopy area, or basal area of a tree species by the area of all observation stations (m<sup>2</sup>/ha). Basal area values were obtained by calculating the cross-sectional area of tree trunks that had been measured in diameter. Relative dominance was obtained by dividing the dominance of the species with the dominance of all species found and then multiplied by 100%.

$$Da = Ba_i / A$$

Description:

$Da$  : Dominance of the  $i$ -th species

$Ba_i$  : Total basal area of the  $i$ -th species

$d$  :  $\pi d^2 / 4$

$A$  : Total area of observation

$$Dr. = \frac{Da}{D_{total}} \times 100 \%$$

Description:

$Da$  : Relative dominance

$At$  : Frequency of  $i$ -th species

$D_{total}$  : Dominance of all species

#### f. Important Value Index

The important value index is an index of importance that describes the importance of the role of a vegetation type in its ecosystem. If the INP of a species is high, then the species greatly affects the stability of the ecosystem (Rakhmawati, 2018). INP for tree, pole, and sapling stand types are (Febriandito, 2019):

$$INP = Kr + Fr + Dr$$

Description:

INP : Important value

index  $Kr$  : Relative density

$Fr$  : Relative

frequency  $Dr$  : Relative

dominance

As for the INP of seedling, herbaceous and shrub stand types are:

$$INP = Kr + Fr$$

Description:

INP : Index of importance

$Kr$  : Relative density

$Fr$  : Relative frequency

The greater the INP value, the higher the tolerance to environmental conditions. The magnitude of the INP value is defined in the table as follows (Hidayat, 2017):

No	Criteria	Indicator
1.	$INP > 42.66$	High importance
2.	$21.96 \leq INP \leq 42.66$	Medium importance
3.	$INP < 21.96$	Low importance

Table 4. Criteria and Indicators of Important Value Index

### G. Socialization of Komodo monitor lizard conservation awareness efforts

The existence of most Komodo dragon populations on the island of Flores, which are located outside protected areas, is very vulnerable to the impact of human activities, so immediate mitigation efforts are needed to avoid extinction or wider reduction of Komodo dragon habitat on Flores Island in the future (Ariefiandy et al., 2021).

To increase public awareness and participation in Komodo monitor lizard conservation efforts, it is necessary to make efforts to conserve Komodo lizards through approaches to village governments, traditional leaders and youth leaders, as well as socialization to community members or education to schools.

The media that will be used is the presentation of material about the ecology of Komodo dragons, the delivery of the main tasks and functions of the NTT KSDA Center and the screening of videos/films about wildlife.

### III. ACTIVITY IMPLEMENTATION

#### A. Tools and Materials

Tools and materials used during the activity are:

No	Name of Tools and Materials	Usage
1	Work Map	As a reference for location and location determination monitoring of the Komodo monitor lizard population
2	GPS	Saving geographic coordinates of the location monitoring the Komodo monitor lizard population
3	Compass	Determination of cardinal directions
4	Digital Camera	Documenting the results of activities
5	Camera trap	Documenting every komodo dragon recorded by a camera with a PIR (Passive infra Red) sensor with triggers in the form of movement or heat with the type of Bushnell
6	Binoculars	View the condition of the population monitoring area komodo lizards
7	Talley sheet and field notebook + stationery	Document field data
8	Meat Bait	As bait to bring komodo lizards to the observation site
9	Nylon Rope	To tie the bait wrapped in plastic
10	Plastic bags and bait boxes	To store the meat and to spread the stench of rotting meat to attract dragons
11	Timer	To determine the observation time
12	Socialization material	As a material to convey socialization
13	Projector	As a media for photo/video playback activities

Table 5. Tools and materials

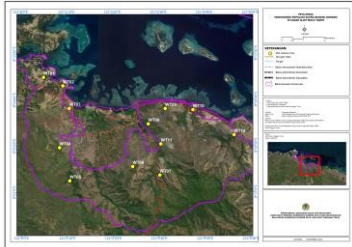
Additional information:



- a) Camera trap, the type of camera commonly used in the BBKSDA NTT working area is the Blaze Video A-252 model.



- b) GPS, this tool is needed to know and mark the location where the camera trap is permanently placed, so that it will be useful for long-term population monitoring programs.



- c) Map, required to guide camera trap positioning and sampling design activities.



- d) Bait (meat), For each camera trap monitoring location, 2 kilograms of bait meat is allocated. Bait is needed to attract Komodo monitor lizards around the camera trap location and also to attract Komodo dragons to the camera trap position, so that their presence can be detected by the camera trap.



- e) Plastic bags for hanging bait, plastic bags are needed to store pieces of bait meat and then hang, to help decompose the meat and spread the stench of rotting meat to attract Komodo monitor lizards, preferably chosen in a striking color, so that later it is easier to recognize the location in the process of taking camera traps.

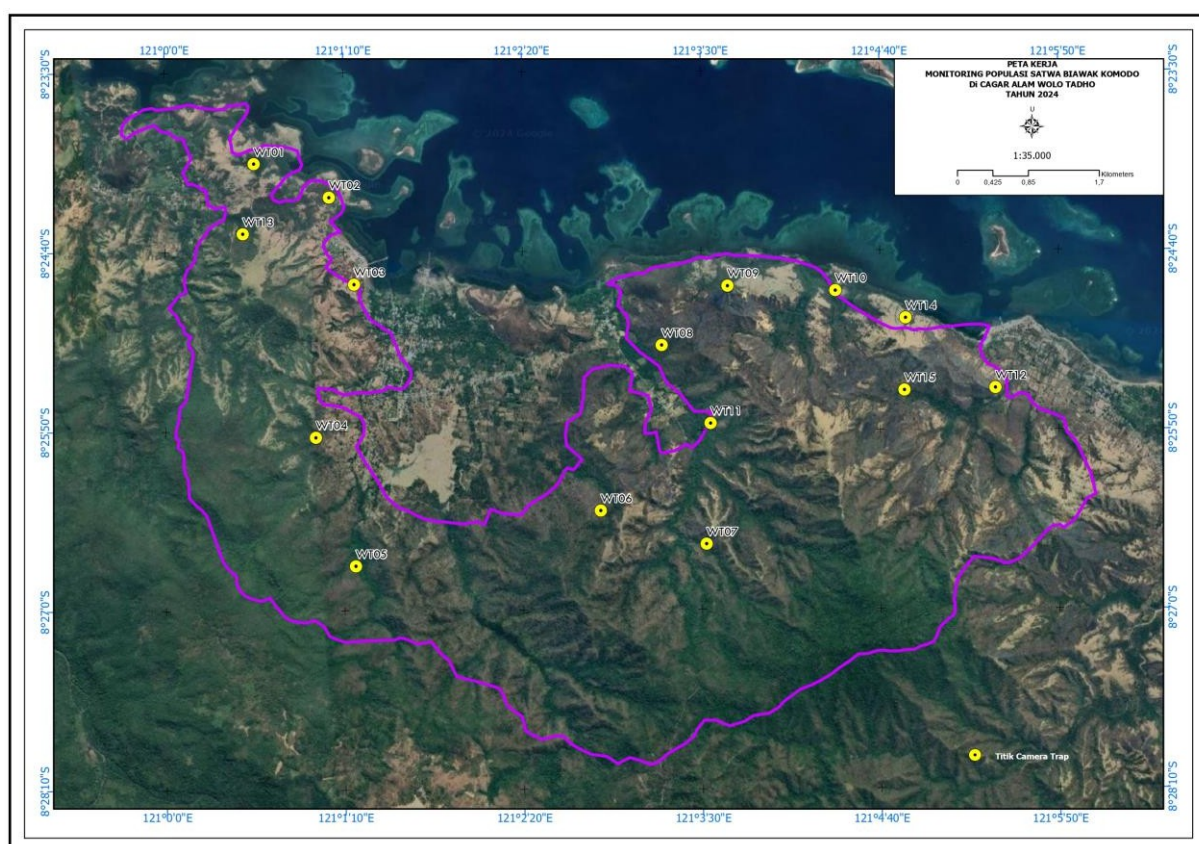


- f) Bait box, a small box, a place to store bait in front, serves to attract Komodo Dragons to the front of the camera trap. The size of the box should not be too small and made of strong material so that it cannot be eaten by Komodo monitor lizards and is not easily damaged / rusted.

Figure 5. Tools and Materials

## B. Location

The location of the Komodo monitor lizard (*Varanus komodoensis*) population monitoring activity was carried out in an area administratively located in Riung District, Ngada Regency, East Nusa Tenggara Province.



Map of camera trap installation locations in Wolo Tadho Conservation Area

## C. Implementation Team

The personnel for the implementation of this activity are planned to be 7 (seven) people as shown in Table 6 below:

No	Name/NIP	Position
1	2	3
1	Beatrix Luisa Wisang, S.P./ 19731006 200112 2 002	Junior PEH Expert in the KSDA Region II Division
2	Ferdinandus Boy Kali, S.Hut./ 19861119 202321 1 007	First Expert Extension Worker at Watunggong Resort
3	Yoseph R. Ranga Wea, A.Md./ 19911204 202321 1 021	Skilled PEH at Bajawa Resort
4	Wahid Fortuna Anwar / 19991019 202203 1 002	Beginner PEH at Bajawa Resort

No	Name/NIP	Position
5	Dionisius Bruno Contends, S.Pi/ 19941009 202321 1 020	PEH First Expert at Riung Resort
6	Marselinus Helmanto/ 19871011 202421 1 007	Manggala Agni at Riung Resort
7	Saverius Arifianto Djematu/ 19920827 202421 1 024	Manggala Agni at Resort Watunggong
8	Robertus Ase Dae/ -	PPNPN Conservation Section Region III

Table 6. Activity Implementation Team

#### D. Time and Schedule of Activity Implementation

Monitoring will be carried out for 10 (ten) days from November 6 to 15, 2024 as per the following schedule:

No	Implementation Stage	Activity Implementation Time													
		November													
		5	6	7	8	9	10	11	12	13	14	15	16	17	
1	Preparation of RPK														
2	Preparation of Tools and Materials														
3	Activity implementation														
4	Data recapitulation and analysis														

Table 7. Time and Schedule of Activity Implementation

#### E. Cost Budget Details

The details of the budget for this activity are as in table 4 below:

No	Description	Amount	Unit	Unit Price	Total Price
1	2	3	4	5	6
<b>A</b>	<b>Material Expenditure (521211)</b>				<b>Rp.14,030,000</b>
1	Tools and Materials	1	Keg	Rp5,680,000	Rp5,680,000
2	Personal use	12	Unit	Rp250,000	Rp3,000,000
3	Meeting Consumption Preparation	20	OH	IDR50,000	1,000,000
4	Meeting Consumption Discussion of Results	20	OH	Rp50,000	Rp1,000,000
5	Duplication and report binding	7	Exmp	Rp50,000	Rp350,000
6	Food materials for laborers (10 people x 6 days)	60	OH	Rp50,000	Rp3.000.000

No	Description	Amount	Unit	Unit Price	Total Price
<b>B</b>	<b>Other Non Operational Goods Expenditure (521219)</b>				<b>Rp.6,000,000</b>
	Labor Wages (10 people x 6 days)	60	HOK	Rp100,000	Rp6,000,000
<b>C</b>	<b>Rental/Transportation Expenditure (522141)</b>				<b>Rp.3,000,000</b>
	Ground Vehicle Rental	1	Keg	Rp.3,000,000	Rp.3,000,000
<b>D</b>	<b>Ordinary official travel expenditure (524111)</b>				<b>Rp.49,240,000</b>
1	Travel from Field / Section				
	- Daily allowance for personnel from Field/Section [4 people x 10 days]	40	OT	Rp400,000	Rp16,000,000
	- Lodging expenses for personnel from the Division/Section [4 people x 9 days]	36	OT	Rp200,000	Rp7,200,000
2	Travel from Resort				
	Personnel daily allowance from Resort [6 people x 10 days]	60	OT	Rp170,000	Rp10,200,000
3	Travel in the context of Supervision				
	Daily allowance [2 persons x 4 days x 1 day]	8	OH	Rp.430,000	Rp.3,440,000
	Lodging expenses [2 people x 3 days]	6	OH	Rp.400,000	Rp.2,400,000
	Transportation costs [2 org x 1 keg]	2	OT	Rp.5,000,000	Rp.10,000,000
<b>Total</b>					<b>Rp. 72,270,000</b>

Table 8. Cost Budget Details

## F. Report

The report is prepared by the Implementation Team as documentation of the results of the activity and as an accountability material for the implementation of the activity.

#### IV. ACTIVITY RESULTS

##### A. Monitoring of Komodo monitor lizards

From the results of the installation of camera traps at 15 locations, it is known that 7 camera trap points captured the presence of Komodo dragons, as shown in the table below:

### TALLY SHEET DATA CAMERA TRAP

Lokasi : CA. Wolo Tadho

Tahun: 2024

No	ID Camera	12-Nov-24	13-Nov-24	14-Nov-24	15-Nov-24	16-Nov-24	17-Nov-24
		Hari ke 1	Hari ke 2	Hari ke 3	Hari ke 4	Hari ke 5	Hari ke 6
1	WT 01	0	0	0	0	0	1
2	WT 02	0	0	0	0	0	0
3	WT 03	0	0	0	0	0	1
4	WT 04	0	0	0	0	0	0
5	WT 05	0	0	0	0	0	0
6	WT 06	0	0	0	0	0	0
7	WT 07	0	0	0	0	0	0
8	WT 08	0	0	0	0	1	0
9	WT 09	1	0	1	0	0	0
10	WT 10	1	1	0	1	0	0
11	WT 11	0	0	0	0	0	0
12	WT 12	0	0	0	0	0	0
13	WT 13	0	0	0	0	0	0
14	WT 14	1	1	1	0	0	0
15	WT 15	1	1	1	0	1	1

Table 9: Komodo monitor lizard presence data

Although the Komodo dragon population is still difficult to find in Wolo Tadho CA, it is easier to find when compared to the previous year's data. Until now, the distribution area is in several locations in Wolo Tadho CA with the following map:

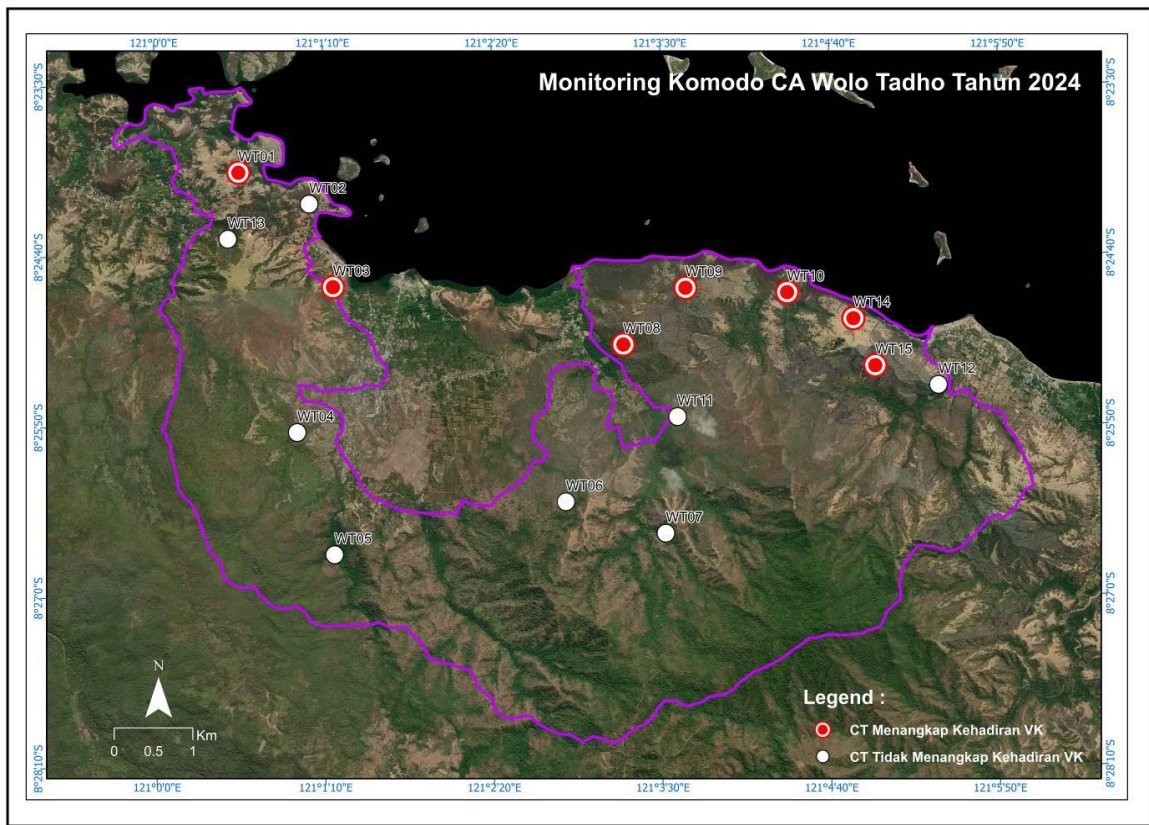


Figure 7. Map of the distribution of Komodo monitor lizards caught by camera traps.

Some images of Komodo monitor lizards captured by camera traps:



Figure 8. Capture of Komodo monitor lizards

## **Analysis Result**

The estimated density of Komodo monitor lizards per camera trap has a value of 0.6290. The estimated proportion of Komodo monitor lizard occupancy in the study area in Wolo Tadho CA was 0.4669. While the estimated value of Komodo monitor lizard abundance in the Wolo Tadho CA study area showed 9.43 and the estimated probability of detection was 0.3029.

The number of camera traps installed was 15 cameras with a distance of 500 meters between camera traps. Komodo dragon olfactory distance is 500 meters, with the detection distance of each camera overlapping and not overlapping each other, the detection radius of the camera is  $\pm 500$  meters.

From the results of camera capture, it can be seen that Komodo lizards in Wolo Tadho CA are relatively healthy, this is shown through photos at the base of the Komodo lizard's tail that looks fat (convex) not concave. As is known, based on several studies, the base of the tail of the Varanidae lizard family (monitor lizards) (including Komodo monitor lizards) is a storage place for fat reserves (Ariefiandy et al, 2012). However, security of the Komodo monitor lizard population area is still considered to maintain the survival of the lizards.

## Discussion

Of the 15 camera trap installation points, there were 7 points that detected the presence of komodo lizards.

Presence analysis showed that the average estimated density of Komodo dragons per camera trap during monitoring at the Wolo Tadho CA study site in 2024 was  $0.63 \pm 0.24$  individuals with a 95% confidence level and the confidence interval value ranged from 0.30 - 1.31 individuals. While the estimated proportion of Komodo dragon occupancy area in the Wolo Tadho CA study area during monitoring was  $0.47 \pm 0.13$  with a 95% confidence level, the value of the confidence interval ranged from 22% - 71%. Therefore, about 47% or almost half of the study area in the Wolo Tadho CA study site was occupied by Komodo dragons at the time of monitoring.

With a detection probability of  $0.30 \pm 0.08$  and a 95% confidence level, the probability of detecting komodo dragons during each session was only 17% - 48%. This means that 30% of the area inhabited by komodo dragons during this activity, if a camera trap is installed for 6 sessions (3 days) of monitoring, the possibility of seeing komodo dragons around is only 30%. While the estimated population abundance of komodo lizards during this activity was  $9.43 \pm 3.54$  individuals with a confidence level of 95%, the total population ranged from 4 - 19 individuals. This shows that the Komodo monitor lizard population in the Wolo Tadho CA study area is relatively difficult to find directly. However, regular monitoring is needed to obtain population trend data to reach a conclusion on the condition of the Komodo monitor lizard population in Wolo Tadho CA.

The minimum number of Komodo dragon individuals known from monitoring activities carried out in the Wolo Tadho CA study area in 2024, obtained from the data tabulation form in Form 2. Individual Estimation where direct counting of each individual Komodo dragon caught in a camera trap is conducted. The minimum number of individual Komodo dragons in this activity was 9 Komodo dragons consisting of 8 juveniles and 1 adult.

## B. Monitoring Komodo monitor lizards' prey animals

From the results of camera captures, it can be seen that there are several animals that have the potential to become food animals for Komodo monitor lizards, including wild boar (*Sus sacrofus*), long-tailed monkeys (*Macaca fascicularis*), cattle (*Bos taurus*), and civets (Figure 10.).



Figure 9. Potential prey animals of Komodo dragons

Using the faecal count method (counting groups of animal feces on plots along the transect line). From 30 transect lines with a length of 150 meters, divided into 30 plots/transect with a plot area of 3.14 m<sup>2</sup>. From a total of 900 plots, several types of animal dung were found, such as monkey dung with a density/hectare of 336.2 ± 21.2, monkey dung with a density/hectare of 159.2 ± 25.7, civet dung with a density/hectare of 35.4 ± 11.0. The following is a photo documentation of animal feces found inside and outside the plot.



Figure 10. Feces of potential prey animals of Komodo dragons

### C. Vegetation Analysis

Sampling intensity is a number that describes the ratio between the number of samples and the total population. Sampling intensity depends on the level of accuracy desired and the heterogeneity of the population at hand (Madyana, 1989). Boon and Tideman (1950) explained that forest groups with an area of

1,000 ha or more, the sampling intensity used should be 2%, while if less than 1,000 ha, the sampling intensity used should be 5-10%. Because Ontoloe Island is less than 1,000 ha, 358.6 ha, the IS used is 5%.

Based on the predetermined IS of 5% of the 358.6 ha area, one path was determined for each camera trap point with a total of 130 plots or measuring plots:

No	Tree species	INP value			
		Seedling	Stake	Pole	Tree
1	Ara	0,24%	-	5,96%	5,84%
2	Acid	8,40%	9,53%	11,89%	<b>76,77%</b>
3	Load	1,46%	0,56%	0,85%	-
4	Split	0,31%	-	-	-
5	Banyan	-	-	1,16%	6,90%
6	Bidara	1,34%	1,80%	3,90%	0,92%
7	Dako	-	-	-	1,99%
8	Dalo	0,63%	1,76%	-	2,81%
9	Damer	5,12%	10,69%	5,33%	0,92%
10	Dange	0,47%	0,98%	-	-
11	Dangkas	0,24%	-	2,11%	1,86%
12	Doel	0,75%	-	0,94%	0,92%
13	In the past	-	-	0,73%	-
14	Gamal	-	0,80%	-	-
15	Gazubakok	2,10%	1,08%	-	-
16	Genevo	3,59%	-	-	-
17	Gilor	1,64%	-	1,76%	6,97%
18	Water Guava	3,71%	14,05%	-	-
19	Forest Citrus	2,44%	0,80%	-	-
20	Johar	-	-	1,21%	-

No	Tree Type	INP Value			
		Seedling	Stake	Pole	Tree
21	Forest Kapok	1,02%	-	-	3,32%
22	Karanteke	-	-	-	-
23	Kate	-	-	-	-
24	Forest Kedondong	-	4,84%	4,87%	17,82%
25	Kembo	-	1,92%	4,55%	0,92%
26	Kemuning	-	6,43%	-	-
27	Canary	-	-	-	3,15%
28	Forest Kepok	-	2,74%	-	-
29	Kerkaja	-	7,45%	3,71%	-
30	Kesambi	3,34%	14,13%	29,53%	30,55%
31	Kesi	4,74%	16,01%	12,44%	0,94%
32	Ketapang	1,14%	1,86%	1,68%	11,01%
33	Keweng	-	0,90%	-	-
34	Kukun	6,41%	<b>35,02%</b>	10,52%	1,84%
35	Pepper	0,24%	2,07%	1,08%	6,58%
36	Lamtoro	<b>38,53%</b>	28,69%	<b>51,79%</b>	26,12%
37	Langa	-	3,42%	-	1,13%
38	Lansi Bakok	-	-	4,06%	3,83%
39	Lasi Ruang	0,71%	-	-	-
40	Leken	4,52%	3,11%	0,93%	-
41	Leli	13,52%	1,42%	-	-
42	Overtime	-	4,05%	-	1,16%
43	Lendu	-	-	2,00%	-
44	Liku Laku	0,67%	-	-	-
45	Lindang Poti	4,78%	-	-	-
46	Leachate	-	0,88%	-	-
47	Liti	-	2,29%	8,73%	3,04%
48	Loi	1,18%	0,99%	-	0,94%
49	Lokom	0,78%	-	-	-
50	Mamis	-	2,69%	0,77%	-
51	Forest Mango	0,28%	2,14%	4,41%	-

No.	Tree Type	INP Value			
		Seedling	Stake	Pole	Tree
52	Marmangge	1,57%	4,04%	-	1,29%
53	Matawara	-	-	-	1,08%
54	Mbera	-	8,23%	0,73%	-
55	Mbizar	0,55%	-	4,49%	0,93%
56	Mbrama	0,47%	10,25%	4,21%	-
57	Melinjo	0,71%	-	-	-
58	Noni	-	1,54%	0,75%	-
59	Mes	3,70%	5,15%	3,74%	7,99%
60	Mondo	-	-	1,17%	0,96%
61	Nandu	-	-	2,13%	0,96%
62	Nara	-	2,76%	3,93%	5,52%
63	Neli	0,31%	-	-	-
64	Nendu	-	-	-	-
65	Ngansar	2,92%	7,46%	11,81%	8,76%
66	Nggulum	-	1,04%	-	-
67	Nila	0,28%	9,35%	16,52%	13,65%
68	Niti	-	0,83%	-	-
69	Nulin	1,27%	1,95%	-	0,96%
70	Nunang	-	5,44%	4,04%	0,94%
71	Ozang	0,74%	-	-	-
72	Forest Palm	0,47%	-	-	-
73	Pampa	1,14%	12,36%	14,12%	6,99%
74	Panduwara	0,66%	-	-	-
75	Pao	2,31%	5,26%	12,43%	5,33%
76	Pasi	1,34%	8,24%	7,97%	1,86%
77	Plots	2,95%	-	-	-
78	Castle	0,95%	-	-	-
79	Princess Malu	0,24%	-	-	-
80	Raut	5,57%	1,43%	-	-
81	Renggiti	0,47%	4,45%	9,82%	6,73%
82	Resa	0,83%	5,30%	6,44%	1,83%

No	Tree species	INP Value			
		Seedling	Stake	Pole	Tree
83	Saramate	6,21%	1,47%	1,61%	-
84	Sebot	1,67%	-	-	-
85	Sekut	-	-	-	1,39%
86	Sewu	3,36%	-	-	-
87	Sita	-	-	0,84%	-
88	Sosor	2,77%	-	0,79%	-
89	Sui	0,28%	-	-	-
90	Code Rope	3,23%	-	-	-
91	Tali Waru	0,63%	-	-	-
92	Taranteke	0,75%	1,29%	-	-
93	Tepo	0,28%	-	-	-
94	Terbolo	3,74%	3,02%	-	-
95	Tride	18,54%	-	-	-
96	Wakatere	1,26%	6,55%	6,71%	3,84%
97	Warang	0,90%	3,09%	9,97%	12,17%
98	Waru	0,43%	-	1,13%	-
99	Waru Laut	0,28%	1,31%	0,74%	-
100	Wool	-	-	-	2,08%
101	Wontung	2,03%	-	-	-
102	Wuta	-	3,08%	2,98%	2,32%

Table 10: Vegetation Analysis Data

The composition of plant species at the **seedling** level was found to be 70 plant species. Of the 70 species that have the highest Index of Important Value (INP) is Lamtoro with a value of 38.53%. Plant species composition at the **sapling** level was found to be 56 tree species. Of these 56 species that have the highest Index of Importance (INP) are Kukun with a value of 35.02%. The composition of plant species at the **pole** level was found to be 50 tree species. Of the 50 species that have the highest Index of Importance (INP) is Lamtoro with a value of 51.79%. The composition of plant species at the **tree** level was found to be 46 tree species. Of the 46 species that have the highest Index of Importance (INP) is Tamarind with a value of 76.77%.

The results of vegetation analysis showed that the dominant vegetation in the study area of Wolo Tadho CA was in the **tree** phase (Tamarind) with an Index of Importance (INP) value of 76.77%. 76,77%.

## VI. CONCLUSIONS AND RECOMMENDATIONS

Of the 15 cameras installed, 7 cameras captured the presence of Komodo monitor lizards, meaning that the Komodo monitor lizard population distribution can be found in the study area in Wolo Tadho CA. The proportion of occupied area in the study area in Wolo Tadho CA was  $0.46 \pm 0.13$  (95% CI = 22 - 71%) which means that a quarter of the study area is inhabited by Komodo lizards with a detection probability of  $0.30 \pm 0.08$  (95% CI = 17 - 48%) which means that each session has a 30% probability of detecting the presence of Komodo dragons. The mean density of Komodo dragons in each camera trap was  $0.63 \pm 0.24$  (95% CI = 0.30 - 1.31) and the estimated abundance of Komodo lizards in the study area was  $9.43 \pm 3.54$  (95% CI = 4 - 19).

In the study area there are animals that have the potential to feed Komodo monitor lizards are monkey droppings with a density/hectare of  $336.2 \pm 21.2$ , monkey droppings with a density/hectare of  $159.2 \pm 25.7$ , civet droppings with a density/hectare of  $35.4 \pm 11.0$ . While there are animals that have the potential to become predators of Komodo monitor lizards competitors from the results of camera capture, namely dogs (*Canis*) and water lizards (*Varanus salvator*).

In the study area, vegetation analysis was also carried out in 150 plots where the composition of seedlings found 70 tree species with the highest importance index value (INP) in the form of Lamtoro with a value of 38.53%, the composition of saplings found 56 tree species with the highest importance index value (INP) in the form of Kukun with a value of 35.02%, the composition of poles found 50 tree species with the highest importance index value (INP) in the form of Lamtoro with a value of 51.79%, the composition of trees found 50 tree species with the highest importance index value (INP) in the form of Tamarind with a value of 76.77%.

Potential threats to Komodo dragons in the Wolo Tadho CA habitat study are snares that have already caught the dragons in the neck. One Komodo dragon caught on camera had its neck entangled and left a noticeable mark.

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Appendix

Raw Data Form 1.

# CAMERA TRAP DATA TALLY SHEET

Location: CA. Wolo Tadhó

Year: 2024

FOgM : RAW DATA  
*(complete drier with iam)*

No.	IO Camera	Date	Date	12-Nov-24	13-Nov-24	14-Nov-24	IN-NOV-24	16-Nov-24	17-Nov-24
		Install	Retrieve	Day 1	Day 2	Day 3	Day 4	Day 5	Day B
1	WT 01	11-Nov-24	1B-Nov-24						11.08. 11.23. 15.37. 16.02
2	WT 02	11-Nov-24	1B-Nov-24						
3	WT 03	11-Nov-24	18-Nov-24						10.35
4	VVT04	11-Nov-24	1B-Nov-24						
5	VVT05	11-Nov-24	1B-Nov-24						
6	VVT06	11-Nov-24	18-Nov-24						
7	WT 07	11-Nov-24	18-Nov-24						
8	VVT08	11-Nov-24	1B-Nov-24					D9.02, 09.23, 09.44	
9	WT 09	11-Nov-24	1B-Nov-24	1224		09.02			
10	VVT10	11-Nov-24	18-Nov-24	13.40, 15.10	08.D4		15.46		
11	WT 11	11-Nov-24	18-Nov-24						
12	WT 12	11-Nov-24	18-Nov-24						
13	WT 13	11-Nov-24	1B-Nov-24						
14	WT 14	11-Nov-24	1B-Nov-24	1747	08.D2	15.12			
15	WT 15	11-Nov-24	18-Nov-24	07.27, 07.49, 08.09. 08.24. 09.27, 09.46, 10 29 17 2Fi	1bb1	08.30		09.5b, 10.12	08.52

Appendix 2. Individual Estimation

CAMERA TRAP DATA TALLY SHEET

Location : CA. Wolo Tadho

Year : 2024

FORM 2: *INDIVIDUAL ESTIMATION*  
*drier u ut with alphabetical code, A, B and so on....*

No.	ID Camera	Date	Date	12-Nov-24	13-Nov-24	14-Nov-24	15-Nov-24	16-Nov-24	17-Nov-24
		Install	Ambit	Harike 1	Harike 2	Harike3	Harike4	Harike 3	Harike 6
1	WT 01	11-Nov-24	18-NOT-24						A2
2	WT 02	11-Nov-24	18-NOT-24						
3	WT 03	11-Nov-24	18-Nov-24						B2
4	WT 04	11-Nov-24	18-No -24						
3	WT 03	11-Nov-24	18-Nov-24						
6	WT 06	11-Nov-24	18-No-24						
7	WT 07	11-Nov-24	18-Nov-24					C2	
8	WT 08	11-Nov-24	18-Nov-24						
9	WT 09	11-Nov-24	18-No -24	D2		D2			
10	WT 10	11-Nov-24	18-Nov-24	E3	F2		E3		
11	VVTII	11-Nov-24	1B-Nov-24						
12	WT 12	11-Nov-24	18-Nov-24						
13	WT 13	11-Nov-24	18-NOT-24						
14	WT 14	11-Nov-24	18-NOT-24	G2	G2	G2			
13	WT 13	11-Nov-24	18-Nov-24	H2	I2	H2	H2	H2	H2

*Estimated number of individuals caught by the camera.'*

Number of individuals

Children: 0  
 Juveniles: 8  
 De 'Casa: 1  
 Total: 9

Appendix 3. Occupancy Data

TALLY SHEET DATA CAMERA TRAP

Lokasi : CA. Wolo Tadhho

Tahun: 2024

**FORM 3 : DATA OCUPANCY**  
 ( diisi data kehadiran komodo, 0= tidak ada, 1 = ada. )

No	ID Camera	12-Nov-24	13-Nov-24	14-Nov-24	15-Nov-24	16-Nov-24	17-Nov-24	Satwa Lainnya									
		Hari ke 1	Hari ke 2	Hari ke 3	Hari ke 4	Hari ke 5	Hari ke 6	Anjing	VS	Sapi	Pita Elegan	B. Gosong	Monyet	Babi Hutan	Kambing	Musang	Elang Ular Kaki Pendek
1	WT 01	0	0	0	0	0	1	1			1	1					
2	WT 02	0	0	0	0	0	0			1			1				
3	WT 03	0	0	0	0	0	1	1						1			
4	WT 04	0	0	0	0	0	0	1	1	1				1	1		
5	WT 05	0	0	0	0	0	0	1	1							1	
6	WT 06	0	0	0	0	0	0	1	1								
7	WT 07	0	0	0	0	0	0	1	1								
8	WT 08	0	0	0	0	1	0	1									
9	WT 09	1	0	1	0	0	0	1		1							1
10	WT 10	1	1	0	1	0	0	1	1								
11	WT 11	0	0	0	0	0	0	1	1								
12	WT 12	0	0	0	0	0	0	1									
13	WT 13	0	0	0	0	0	0	1									
14	WT 14	1	1	1	0	0	0	1	1	1							
15	WT 15	1	1	1	0	1	1	1									

## Documentation

### 1. Bait Preparation



### 2. Camera Trap Installation



3. Prey Animal Dung Monitoring



4. Vegetation Analysis



5. Data Analysis

